[26 cont.]

142 The athletic type thus represents the best realization of the human type among the races.

Since, from the day of conception on, environmental influences are predominantly of a harmful nature, the average type finally arrived at is the type formed by the average harmful effects, which, on the one hand, are of a hereditary and constitutional nature, and, on the other hand, are conditional effects during the individual's lifetime. The more unfavorable the living conditions are, the greater will be the harmful effect coefficient, and the more the average physical type will approach the asthenic. Only environmental improvement, brought about by high civilization, permits athletic forms to develop in considerable numbers.

According to our schema, we may designate the Bushmen as asthenic on the average, and the best developed among them as respiratory. In the case of many male individuals, there is an [146] ability for considerable fat accumulation, and on the farms I encountered a number of Bushmen who had adapted themselves to a flour diet and had considerable body weight.

The digestive type thus certainly does occur among them, [146] even though we must keep in mind that the diet, which is rich in meat and poor in carbohydrates, counteracts its development.

5. The Course of the Day

805 The !Kung Bushmen divide the 24 hour day into seven segments, which are:
[192]
/gam χ'ǎ-o-a, dawn.
/gam do di /gii, time of sunrise.
!nai /kho, (the sun) is in the middle.
ha ti ǂnáu, (the sun) will go down.
χ'ǎ-o ti ǂnáu, the sun is now asleep.
/gu gǎ djo-o, one can no longer see the people because it is dark.
!a ds ĩ, midnight.

512 The division of the day varies somewhat with the season of the year. With the exception of the so-called hot season,

[45 cont.]

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Bushmen stared longingly at the discolored lump of fat. Finally they sent a deputation to me, saying that they wanted the bacon for their dogs. The moment they received it, it was skillfully divided according to families and consumed in the course of a great feast, without any harmful effects.

enormous quantities, but such excesses as a rule are followed by an indisposition. The day after a major feast, almost all of them lie in the sun with stomach-ache and gripes. In other words, even a Bushman should not be credited with the impossible with regard to food; many things that seem repulsive to us, such as earthworms, lizards, thick grubs, mice, and the like, are in themselves not at all harmful to health, especially since the Bushman only eats them cooked or roasted. Bushmen who have grown up on the farms can take the same diet as the Whites or Blacks. On
147 the other hand, the wild Bushmen who have grown up on veldkost
262 and the flesh of wild animals cannot accustom themselves to the
648 work and prison diet of the Blacks. A term in jail of any great length means condemnation to a slow but sure death for most Bushmen. The prisoners show the symptoms of vitamin deficiency, become infirm, get edemata on their legs, dropsy, and unfailingly perish. In the initial stage severe sluggishness of the bowels sets in. Ample portions of fresh meat can keep the Bushman healthy even in imprisonment. The fact that Bushmen run away from the
[464] farms is based in most cases upon their inability to endure any
[146] longer the diet given them. The vitamin need of the Bushman who has grown up in the wilderness is undoubtedly much greater, and his longing for meat, which often appears pathological, can be explained as a physiological craving for vitamins.

Diseases of the Urogenital System

164 Catarrhs of the bladder occur; in such cases a flat stone
[755] is warmed in the fire and placed on the bladder region. Hematuria, evidently the result of nephritis, was twice treated by my friend

/244 cont./

Indices

	Men	Women
141 I. Skull index	76.3	73.5
II. Average index of the skulls of all adults measured	74.77	
III. Physiognomic face index	76.44	76.1
IV. Physiognomic nose index	102.5	97.44

147 [146] The state of nutrition of those examined may in general be called inadequate, and the amount of fat slight. Even among younger individuals the skin is strikingly slack and can be grasped in wide folds. One has the impression that there is a connection between this slackness of the skin and the extreme fluctuation in the saturation of the tissues, which is the rule since the Bushmen experience frequent and long-lasting thirsts. The men assured me that they could march without water for four days in great heat, a statement which surely deserves to be credited.

142 The skin color of all those examined, with the exception of two in whose case racial mixture is a possibility, is a brown of medium tone shading over into yellow.

The palms of the hand and soles of the feet are a lighter color, but do not show such a striking contrast with the back of the hand as is the case among the Bantu /245/ Negroes. The skin of the chest and abdomen has a slightly darker coloration than that of the face. Scars are very common, especially on the chest and abdomen, and [513] usually stem from burns to which the Bushmen readily expose themselves by sitting and sleeping near the open fire. These scars have a lighter tinge than the surrounding skin and look almost pure yellow.

The iris of all those examined is deep brown in color.

Compared with Europeans, the hair growth of the Bushmen is very modest. It is confined almost entirely to the skull; beards are found only on a few men and even then they are sparse. Hair elsewhere on the body, including the arm pits and pubic hair, is practically nonexistent.

The color of the hair on the head is a deep black. The individual hairs grow to a length of about four centimeters for men and about six centimeters for women. The hair is fine and curled in a spiral. The curvature radius of the spiral amounts to about two

137 spreading some like the Grewias and the melons whose seeds pass through the alimentary canal apparently unharmed and reducing others like the Eulophias and Vignas which have edible underground storage organs. It is perhaps significant that, with two exceptions, the edible members of the family Asclepiadaceae were rarely found. In this paper there are 11, from Raphionacme to Fockea inclusive—nearly all important food plants with underground storage organs. The two commoner exceptions were *Sarcostemma viminale* which is sometimes poisonous and *Pentarrhinum insipidum* which has edible leaves and fruits but an inedible perennial root.

146 I am not qualified to speak on the health of the Bushmen, but it is apparent even to the layman that they are very unlikely to suffer from any deficiency disease while on their natural diet. When they are recruited for labour and fed on an unbalanced diet their health will be undermined and they will be less able to resist the rigours of their normal life when their contracts expire.

11.4 Their study by serious workers is to be encouraged for it should lead to their stability as a race and the enrichment of our knowledge, but contacts with irresponsible strangers is unfortunate and observations like the following by Brown (1954: 130) are valueless and regrettable:—

> "They are wonderful runners. When I chased one with the clanging of a bell he set off at a good bat into the distance, and kept it up until out of sight."

122 During the three months in which the field work was done, the expenses of my transport and keep were met from the funds of the expedition, and this I gratefully acknowledge. Dr. R. A. Dyer, Chief of the Division of Botany, gave me the opportunity of joining the expedition, and all facilities for working up the results of the field work. Most of the determinations were done by my colleagues in the Division of Botany, and of them Miss I. C. Verdoorn, author of *Edible Wild Fruits of the Transvaal*, read through the typescript and gave me valuable advice. Dr. L. E. Codd deserves special thanks for the way he saw to the growing of the considerable quantities of roots, bulbs and seeds sent from the Kalahari. 000 I thank Mr. L. K. Marshall, who led the expedition, and the members of it, [115] for their interest and kindness, also Kernel Ledimo, a fluent speaker of the Eastern !khũ language, who was always ready to translate or to pilot me through its little-known and fascinating grammar and phonetics. My notes on the Bushman languages were kindly checked by Prof. L. F. Maingard, and the ethnological literature was supplied mainly by Dr. N. J. van Warmelo of the Department of Native Affairs. I am indebted to Messrs. Midgeley, Martin and Scholtz of the Bechuanaland Administration for hospitality and for enabling me to see parts of the territory that I should not otherwise have seen. My thanks would not be complete without mention of the Bushmen whose knowledge is the foundation of this paper. [124] The information was seldom reluctantly given—usually cheerfully and with humour, and always with intelligence.

7:Story N-5 (1955) 1958 FX10 Bushmen FX10

The following observations were made in the Transvaal near Pretoria, where infestation by *Cirina forda* is frequently so heavy that the affected trees may be readily recognised from a distance from the way in which the leaves are stripped. The caterpillar is prepared for food by being grasped by the head and squeezed through the thumb and forefinger of the free hand with a milking action. This clears out the bowel contents, and no further preparation is necessary before the boiling which follows. The head is rather hard and may be removed, but this is not necessary. After light boiling or roasting the caterpillars are dried in the sun and may be stored without deteriorating for several months. They are slightly oily but crisp in texture, with the smell and flavour of kippers.

Bauhinia esculenta Burch. (5160) Photographs 19 and 20.

Eastern !khû Bushman tsi: (the seed)
nlɨ: (the storage organ)

This plant is a runner in open grassveld, with numerous slender vines up to 18 feet long, the youngest parts of them covered with a fine brown tomentum. They bear inch-long Y-shaped tendrils, but the plant is not a climber. The vines die back during the winter but do not disintegrate as readily as those of the Cucurbitaceae, and are conspicuous until the new runners are produced from the perennial underground stem. The leaves, which are soft and reddish-brown when young but turn leathery and glaucous as they grow older, are deeply bilobed, with a small spur between the lobes. The plant bears showy yellow flowers in December, and the pods ripen from April onwards. At first they are soft and reddish brown, then light green and, when ripe, brown and woody. They contain up to six flattened seeds about the size of one's thumb nail, consisting of a hard shell and a soft nutty edible inner part. The plant is easily seen because of the craters it forms where the soil is stony—craters a yard or more across, edged with a ring of stones which appear to have been forced to the surface by the stem beneath. The details of this crater formation, however, are not known.

This Bauhinia is curiously patchy in its distribution. Although it is plentiful in some places near Vryburg, it was not seen along the route of the expedition until a point 400 miles north of Vryburg, that is, 127 miles before Ghanzi was reached, and I have no record of it after leaving the Ghanzi area until the expedition crossed the border into South West Africa near Gam, after which it was again plentiful. It occurs in communities sometimes miles across, with the plants in these communities scattered 20 to 30 yards apart. On the expedition it was seen growing only on deep sand or where there were outcrops of limestone, and near Pretoria it has so far been seen only on the dolomite, but it has been grown successfully in Pretoria on neutral shaly soils. It has been recorded from the northern Cape Province, the western Transvaal, the Bechuanaland Protectorate and South West Africa.

Although the seeds are not pleasant to eat when raw, they are excellent after roasting, and analysis figures show that they are rich in protein and oil. The roasting should be carried out slowly, otherwise they may shatter with a rather disconcerting report, and to avoid this they are often roasted in sand, which probably gives a slower and more even heat. They may also be boiled to make a porridge or a drink. They will last through the winter in the field without spoiling but become scarce towards the spring, probably through being covered with wind-blown sand and being eaten by animals.

7:Story N-5 (1955) 1958 FX10 Bushmen FX10

X137 *Grewia retinervis* Burret (4875, 5066) Photograph 31.

!h5: Bushman.....	⊙b5:
ǁganakwe Bushman...	ǁ?ani
ǁgikwe Bushman.....	ǁgani
Naron Bushman.....	ǁgani
Eastern !khū Bushman	ǁgwa

A straggly many-stemmed five-foot shrub, sometimes a weak scrambler up to 10 feet high. The stems are half an inch thick at the base, rounded and slightly woolly when young, slightly flattened and glabrous when old, and tough and pliant. Its leavers are alternate, pale green, one and a half inches long and an inch wide, ovate with a pointed tip, toothed, and roughly hairy to the touch. They wither and fall soon after being frosted, but if out of reach of the frost remain on the bushes at least until the end of July. The plant bears spreading yellow flowers half an inch wide, and fruits the size of a pea, with a papery brown skin enclosing a few large pips and some fibrous mealy material. *Grewia retinervis* is closely allied to *Grewia flavescens*, so much so that I doubt whether the two should be considered anything more than varieties of one species. The differences are that *Grewia flavescens* is usually taller, and not so conspicuously veined on the upper surface of the leaves. Mr. B. de Winter, of the National Herbarium, Pretoria, has observed also that its older stems are square in section and those of *Grewia retinervis* are flattened.

Grewia retinervis was scattered over most of the area covered by the expedition, and common in the central Kalahari, specially in open grassy country. It has been recorded from the northern Cape and the Transvaal as well as South West Africa and the Bechuanaland Protectorate.

262 The fruits are edible. They ripen in winter, and have a slightly sweet (251 taste and a pleasant flavour. They may be stored after being dried, and 252) are then soaked or boiled before being eaten. The crop, if one may judge from the 1955 season, is abundant, and the amount fairly constant for all the bushes. The fruits form an important part of the Bushmen diet, [146 although little of them appears digestible. The roughage is voided almost 147] unchanged, in enormous faecal masses up to two and a half inches in diameter.

824 The dry stems of this plant nearly always contain the tunnelings of 372 grubs, and the tunnellings are packed with their excreta in the form of a brown, pith-like substance which forms a useful tinder. The Bushmen split the stems down the centre, make a slight depression in the flat surface and use this as a socket for the fire-drill.

X137 *Grewia* sp. aff. *Grewia bicolor* Juss. (5056).

Eastern !khū Bushman gamak'wɔ:

A slender shrub up to six feet high, with many sparingly branched stems. The leaves are one and a half inches by one inch, very finely toothed, dark green above and pale below, pointed at the tip and rounded at the base. Both surfaces are covered with a fine grayish felt which is thicker on the lower surface. Typical *Grewia bicolor* has wool on the lower surface only. The fruits are the size of a pea, and have a little flesh covering usually one big seed. No flowers were seen.

This is another of the plants with a distribution which begins in the Ghanzi area and extends northwards, and the remarks made as to the distribution and importance of *Grewia flavescens* apply here also.

[262] The fruits are edible.

262
824 nutritious.[1]

It should be added that meat is considered by all the Bushmen as a primary food. Informants agreed that an ideal diet should consist primarily of meat and mongongo nuts. In actual practice this ideal is not always attained.

II. Major foods - After Ricinodendron there are eight species that Bushmen consider as major foods but none of these rate high on all five criteria of desirability. There are three species which are superabundant in quantity and delicious to the taste, but are available for only a short period of the year. They flourish during the rains but by winter, three months later, they have become shrivelled and dried out. The three summer species are: Grewia flava, the morethlwa berry; Ximenia caffra, the sour plum; and Citrullus

[312] lanatus, the famous Tsama melon. The latter species also serves as an alternative source of water but this is not important in terms of food strategy because the season of Tsama melons coincides with the season of abundant standing water. Among the /gwi Bushmen of the Central Kalahari Game Reserve, the Tsama melon is a more important source of water because it

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[146] [1] The nut of Ricinodendron has been chemically analyzed (quoted in Watt and Breyer-Brandwijk 1962:428). The kernel of the nut was found to yield 60%, by weight, of a quick-drying fixed oil, rich in proteins. The fruit of the nut, which is also eaten by the !Kung Bushmen, yielded, among other constituents, 31% saccharose and 7.9% protein.

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[162]
[361] There were nine adult men resident at this camp but only seven did any hunting. The eighth man was blind and the ninth was crippled. The seven hunters were n/eysin!a (60 yrs.) and his son /oma (35 yrs.); /oma//gwe (65 yrs.) and his three sons /ase (40 yrs.), /gau (35 yrs.), and n/eysi (27 yrs.); and /gaun!a (40 yrs.), the son-in-law of n/eysin!a.

[231] The most successful hunter, /oma (35 yrs.), hunted 16/28 days and killed four wart hogs and a bat-eared fox, all killed with the aid of dogs. Next was /ase (40 yrs), who hunted nine days. He snared two steenbok and a hare and killed a porcupine by cornering it in its burrow and digging it out.

Then there were the two old men both of whom hunted 16 days each. /oma//gwe snared a steenbok, a honey badger, a hare and a kori bustard, and collected a python. N/eysin!a snared two steenbok.

Old /oma//gwe's two younger sons hunted nine and eight days, respectively. The older of the two, /gau, snared one korhaan; the youngest son, n/eysi, also snared one korhaan.

Finally old n/eysin!a's son-in-law, /gaun!a, hunted four days but killed nothing.

[146] The seven men hunted a total of 79 man-days and killed 18 animals; the total weight of meat is estimated at 454 lbs. In addition, they received gifts of meat from other camps

224
146 totalling 36 lbs. This meat (490 lbs.) went to feed a camp of 42 people (exclusive of visitors).

A rough calculation of the weight of meat per person per day through this 28-day period gives a figure of 6-2/3 oz. of meat. The daily intake of vegetable foods per person during the same period can be estimated at 24 oz. (of mongongo nuts and various roots). Therefore a reasonable estimate of the ratio of meat to vegetables in the diet of this camp is 25%-75%.

This ratio is based on observations at one camp during [114] one season only. It can be said, however, that George Silberbauer, Laurence and Lorna Marshall, and the author are in general agreement that meat comprises between 20% and 40% by weight of the Bushman diet (Silberbauer, 1965:28; Marshalls, personal communication).

5. Late Winter

221 There is a well-defined break point in the winter subsistence cycle between the early period (May, June and July) of relative abundance and the late winter and spring period 221 of increasing food scarcity (August-September). Through the 222 early winter the Bushmen concentrate on the mongongo nut groves 462 that are within a day's walk of permanent water. Groups of women go out once every three or four days, fill their karosses with nuts and return to the camp in the evening. The men

221
222 well into September. On the other hand, at /ai/ai, where 109
184 Bushmen were living, the local mongongo nuts were exhausted at the beginning of July.

Since each territory was known for a different selection of winter foods, the transition took a different form at each waterhole. At Dobe, the mongongo nuts were replaced as the staple of the diet by Baobab fruits (Adansonia) and vegetable ivory palm hearts (Hyphaene). At Bate the people shifted from mongongo nuts to Sclerocarya caffra nuts. At !angwa, the people concentrated on collecting Acacia spp. gums.

221 In general the diet of the Bushmen becomes much more
824 eclectic during the latter half of the winter. It was during
• 146 this season that the Bushmen took advantage of a wide selection of edible species. Instead of eating mongongo nuts with a few other species as "side dishes", the people had to diversify their diet in order to live well. During August and September no less than 25 species of roots, bulbs and edible gums formed the basis of the diet.

222 There was an alternative strategy to eating less desirable
312 foods. If a family was prepared to make the effort required to reach the nutting groves, they would fill their water containers (ostrich egg shells and the stomachs of antelope) and walk to the nuts. They would collect and eat there until